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ABSTRACT

Among the goals of multicultural and social reconstructionist education are to improve academic achievement, increase appreciation for cultural differences, develop problem-solving skills, and encourage social action. This curriculum unit is concerned with the infusion of multicultural ideals into the elementary science curriculum. A total of 10 lesson plans on air pollution, water pollution, and recycling for elementary-age students are developmentally appropriate, interdisciplinary, innovative, and action oriented. A modified version of the North Carolina Effective Teacher Lesson Plan Model provides the basic outline. Lesson plans contain sections on grade range, approximate time, goal, student objectives, materials, background information and focus, input, guided practice, independent practice, closure, evaluation, extension activities, activities for upper elementary students, connections to other subject areas, and resources. In addition, each lesson features a brief explanation describing how the lesson demonstrates multicultural principles. (LZ)

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**Environmental Equity:
A Curriculum Unit for
the Elementary Grades**

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**Sponsored by the Environmental Protection Agency
in Cooperation with North Carolina Central University**

School of Education

Durham Public Schools

Warren County Public Schools

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ENVIRONMENTAL EQUITY:

A Curriculum Unit for the Elementary Grades

Table of Contents

Introduction-----	1
Water Me!-----	6
Detecting Water Pollution-----	16
Making Polluted Water Clean-----	21
Respecting Our Rain Forests-----	27
Garbage, Garbage Everywhere-----	34
Ready - Set - Recycle-----	40
Recycling Makes Sense and Cents-----	49
Where's the Fresh Air?-----	52
How Clean Is Our Air?-----	56
Environmental Proverbs-----	59

A Curriculum Unit for the Elementary Grades

Background

Demographers report that even as public school populations are becoming increasingly more ethnically, linguistically and economically diverse, the teaching force is becoming more homogeneous. Coupled with these data is the fact that many economically disadvantaged students, students of color, and students for whom English is a second language generally perform academically less well than their advantaged counterparts. These trends suggest the need for new educational practices that respond to the needs of diverse learners. Research also shows that in addition to the need for response to changing demographics, there is a need for creating a clean and healthy environment and one of the best ways to achieve that goal is to improve the environmental literacy of our children.

North Carolina Central University's (NCCU) School of Education is in the forefront of addressing diversity issues in the teaching and learning process. The School's knowledge-base theme, "Educators for Diverse Cultural Contexts," reflects a commitment to a comprehensive multicultural teacher education program. The Environmental Protection Agency (EPA) has awarded NCCU a grant to support efforts toward the development of a curriculum unit on environmental equity.

This curriculum unit is the result of a public school - university collaboration. The unique focus of this unit is its infusion of a multicultural perspective into a science curriculum.

The curriculum also draws on the North Carolina Standard Course of Study.

Multicultural Education

Leading scholars indicate that the term **multicultural education** means different things to different people. Nevertheless, it appears that these scholars agree on at least two important goals: to improve the quality of academic learning for students, regardless of ethnicity, and to help all students develop the life-values, behavior, and attitudes they will need to survive and function effectively in society.

Traditionally, educators view multicultural education as a separate course of study or as a topic germane to courses such as language arts and social studies. Technical courses are generally considered off limits. This unit challenges that tradition, and demonstrates the infusion of multicultural ideals into the elementary science curriculum.

Theoretical Underpinnings

During the curriculum writing process, our team created a shared vision of multicultural education. Taking up the foregoing challenge, we agreed that multicultural education is multidimensional and that these ideals should permeate every aspect of the school's curriculum.

Sleeter and Grant (1994) indicate that most educational programs can be categorized into one of five approaches. Their preferred approach, education that is **multicultural and social reconstructionist**, provides the overarching theoretical framework

for this unit. Among the goals of the education that is multicultural and social reconstructionist approach are to: improve academic achievement, increase appreciation for cultural differences, develop problem-solving skills, and encourage social action.

Banks' (1994) dimensions paradigm provides the operational framework for the infusion process. Banks describes multicultural education as consisting of at least five different dimensions: content integration, knowledge construction, equity pedagogy, prejudice reduction, and empowering school culture and social structure. These five are described as follows:

Banks' term, content integration, refers to teachers' use of examples and content from a variety of cultures in their teaching. Knowledge construction refers to methods teachers use to help students understand how knowledge is created. This is an important dimension because multicultural education is largely a way of viewing reality and a way of thinking. This dimension denotes the importance of having students view issues from perspectives comfortable to their own background and to different backgrounds. The third dimension, an equity pedagogy refers to the teacher's use of a wide variety of instructional strategies that are compatible with the diverse learning styles of students in the class. The fourth dimension, prejudice reduction, relates directly to the attitudinal component of multicultural education. It refers specifically to the reduction of thinking processes that lead to stereotyping, discrimination and prejudicial behavior. The fifth

dimension, an **empowering school culture**, refers to an examination of school practices and policies that perpetuate inequities. For the purpose of this unit, this dimension is extended to refer to environmental policies that reflect social inequalities, beyond the school.

It is important to note that these dimensions do not occur as discrete segments. Rather, they occur simultaneously and are totally integrated and interrelated. The typology is helpful because it provides a means of organizing and thinking about multicultural education in ways that expand the concept and make it more accessible for the classroom teacher.

A combination of Sleeter and Grant's (1994) **education that is social reconstructionist's approach** and Banks' (1994) dimension paradigm provided the underlying principles that guided us as we selected materials, identified instructional strategies, and created extension activities. Throughout our work on this curriculum development, we pledged to continuously upgrade our knowledge base about varied cultural groups and improve our skills in responding to the needs of diverse learners.

Unit Design

Curriculum developers also considered it important to create lesson plans that are developmentally appropriate, interdisciplinary, innovative, and action oriented. This unit contains a total of 10 lesson plans on air, water, and recycling, for elementary-age students. A modified version of the North Carolina Effective Teacher Lesson Plan Model provides the basic

outline. Included with each lesson plan is a brief explanation describing how the lesson demonstrates multicultural principles. At the end of each lesson plan is a list of resources. We encourage teachers to carefully examine these plans, use them in toto or adapt them to particular needs, and provide us with feedback so that we may continue to upgrade and improve our product.

References

- Banks, J.A. (1994). **Multiethnic education: Theory and practice** (3rd edition). Needham Heights, MA.: Allyn and Bacon.
- Sleeter, C.E., & Grant, C.A. (1994). **Making choices for multicultural education: Five approaches to race, class and gender.** New York: Macmilllan.

WATER ME!

Margaret Marsh

Grade Range: K-3

Approximate Time: 3 (30 minute classes with a total of 90 minutes)

Goal: The three-part focus of this lesson is to demonstrate the importance of water for all living things, to examine ways that we use water, and ways we can conserve water.

Objectives: Students will do the following:

1. Identify the effects of a lack of water on living things
2. Identify the effects of sufficient water on living things
3. Locate various geographical areas and their water sources
4. List ways that different groups of people use water
5. Identify personal uses for water
6. Identify personal water conservation strategies

Students will demonstrate mastery of above stated objects with 80% accuracy.

Materials:

1. Pantomime cards (printed cards to suggest act-outs such as the following:)
 - a very thirsty puppy
 - a person with a dry throat
 - a withering plant
 - a plant that is being watered
2. World map and world globe

3. Plants, paper cups with dirt
4. Drawing paper, graph paper, art tape, crayons, magic markers
5. Word cards listing groups
6. Magazine pictures (or ads) for cut-outs
7. Poem "Water" by Stryker & Bingham

Multicultural Focus:

Brown (1990) defines a cultural value system as rules for living that a group of people develop based upon who they are, where they are, and the perceived resources available. In addition to the stated goals, this lesson is designed for students to explore various cultural value systems through an examination and analysis of water usage and water conservation from different cultural perspectives.

Background Information and Focus:

(Note: Teacher's questions are in bold print.)

Read Poem "Water" by Stryker & Bingham

Water

Water's what we bathe in,
Water's what we drink.
Water's what keeps plants alive.
Without it, fish would sink.
Water comes from rivers,
Water comes from rain,
And every drop that's wasted
Is just water down the drain!

According to the poem, what are some of the ways that we use water?

What are other ways, not mentioned in the poem?

According to the poem, where does water come from?

(These questions are designed to encourage good listening skills and promote critical thinking.)

Name those things that need water in order to survive.

All living things need water in order to survive. Plants need water to live, to grow and to reproduce new plants. Animals must have water to live and thrive also. We as human beings are dependent upon water in our lives. In fact, we need water to live more than we need food.

What happens to plants when they do not get enough water?

When water is scarce there's not enough of it, living things suffer. Plants begin to wither and die. Animals die of thirst and because they lack food as the plants disappear. Animals must also have water to live.

In some parts of our world, water is scarce. Areas that are located near major bodies of water or lakes, rivers and streams have more access to water.

Describe ways that you use water in your daily life.

All people need clean water in order to live and to be healthy. We need clean water to drink, cook and wash. Different groups of people use water in different ways. The elderly may not use water in the same way as a playful 7 year old. Firefighters use water differently in order to do their jobs effectively, to put out fires.

No matter where we are located in the world, no matter what our jobs are within the community or the home, we all need clean water so that we may live.

Input:

As an anticipatory set, turn on the tap to the sink. (If there is no sink within the classroom, pour water from a pitcher into a bowl.) Ask students if they can tell you some words that describe what they see and hear. Students may respond with words such as:

wet	cold
splash	splatter
clear	drink

Tell the students that water is not only important in our lives as human beings, but in the lives of all living things.

Next, show students a little container with the pantomime cards inside. Ask if they have ever seen a living thing in need of water. Wait for responses. Explain the procedure for the pantomime game. Tell students that you will select one at a time to "act out" the situation that they selected from the container.

Ex: For a very thirsty puppy, the student may pretend to be the puppy with tongue extended and may show how a puppy acts when it needs water.

Briefly allow students to act out all of the pantomimes in the container. To act out the plant roles, students may stand straight, then droop head.

Upon completion, allow students to observe how water

affects a living plant. Show students the two plants that have already been planted. One plant should be healthy as it has been watered. The other plant should be withered. Discuss the differences between the two plants. Ask children to describe how the different plants look. Why do you think the withered plant looks this way? What can we do to make the plant healthy? (Children will respond by saying to water it.) Do this. Water the plant. You may allow a student to assist. Set the two plants aside and encourage students to observe them throughout the day. At the end of the day, discuss their observations.

Continue with the lesson, telling the students that not only plants but also animals and people need water. All living things all over the world need water. Next, display a world map. Identify the land areas and the water areas. As you describe these areas, use the terms continents, oceans, lakes, rivers, canals and streams. A globe may be used to project an aerial view. Question students about which areas or locations they think may have better access or more opportunity for water usage. Have them explain their response. Compare and contrast areas from other continents with your own specific area. Do people use water in the same way? Why or why not? Write students' responses on a chart for display throughout the lesson.

Leave the map for display, but begin a discussion on how different groups of people in our own community use water. Do they use water in the same way? How do different groups use water differently?

Discuss water usage among these groups.

firefighters

family members

elderly

physicians, dentists, nurses

young children

cooks

church groups (children will invariably say something about the different religious groups to which they belong)

Ask students, How do the people in each group use water? Do people waste water? In what ways can each group conserve water usage?

Guided Practice:

Show students word cards that have the groups of people listed as discussed previously.

firefighters

family members

elderly

physicians, dentists, nurses

young children

cooks

church groups

Tell students that they should choose any four of the groups listed and list ways that the group uses water.

Give each student a piece of drawing paper and demonstrate folding the paper into two sections, making four divisions. Students should fold along with the teacher.

Invite students to label each section with a group chosen. Students should write the name of the group in the section and list ways in which that group used water. Students should head each column with a drawing of the group or a pasted cutout for non-artists.

Independent Practice:

Student pairs will discuss previously learned materials and work together in listing water usages. The teacher will circulate among students offering and giving help as needed. Teachers should encourage students to complete projects by the end of the class period.

Closure:

As the class period ends, review the assigned activity. Select two or three student pairs to share their work. Display all of the students' work on the classroom bulletin board. Read aloud Aardema's book, Bringing the Rain to Kapiti Plain. This is a story about a South African family waiting for rain during a period of drought. Contrast this by reading a story about flooding in Amsterdam or another Scandinavian country that has too much water. Have children compare the games, clothing, and housing styles of children in contrasting societies. Have students discuss the different lifestyles (culture) that develop because of the amount of water available. National Geographic is a good resource for authentic pictures.

Evaluation:

Students will demonstrate knowledge by writing or drawing in their science journals on one of the following topics:

- "Why living things need water"
- "How I use water and ways that I can conserve water"
- "How a (community worker) _____ uses water"

- "How water is used in _____" (insert the name of a foreign country that you have read about)

- "How water is used in _____ vs how it is used in _____."

These topics can be used for a language experience approach lesson. The stimulus for the foreign country comparison is for the teacher to have read stories contrasting two countries and how the water supply affects the lives of the citizens of that country.

Extension Activities:

Activities for lower elementary students:

- Have children color the world map. Write the names of the bodies of water on the map. Label one country with a plentiful supply of water. Label one country with a scarce supply of water. Write one sentence or draw a picture to show the difference between the two countries.

- Encourage children to perform the plant experiment at home. Children will water one plant and allow the other to go without water. They will observe what happens when they water the withered plant and draw a picture of how the plant looks each day or bring them in (paper cups for "pots") to share.

Activities for upper elementary students:

WRITING

- Write a story. Imagine that you are a plant and describe how you feel being deprived of water and how you feel when you are watered. Be sure to describe who waters you (e.g., is it a person or mother nature.)

RESEARCH

-Find stories from around the world that describe people's attitudes regarding water. Compare a cultural group with a sufficient water supply and a cultural group with an insufficient water supply. List three major differences between the two groups.

Connection to other subject areas:

Math - The class will graph their use of water in two days --before conserving and after conserving. Examples of items to include on the graph are:

1. Drink water
2. Wash hands
3. Flush toilet
4. Make art project
5. Water plants

Each time you use water in these ways, or other ways, write your name on art tape and code it on the graph.

Communication - Find out how different people in the school use water for a day. Individuals to survey might include the following:

1. Principal
2. Secretaries
3. Counselor
4. Students
5. Teacher
6. Janitor
7. Cafeteria worker

Make a chart and display your findings.

Write a poem like "Water" and describe the use of water in your life.

Geography - Research areas that have had droughts. Write a report. Interview people in this region who remember summers when we experienced drought conditions; write a story about the interview, or tape the interview.

Art - Paint or draw a picture of you using water in your favorite way.

Resources

Aardema, V. (1981). **Bringing the rain to Kapiti plain.** New York: Dial Press.

American Forest Council. (1992). **Project Learning Tree.**

Brown, J. (1990). **A world of difference.** New York: Anti-Defamation League.

Stryker, S. & Bingham, M. (1990). **Mother nature nursery rhymes.** Santa Barbara: Advocacy Press.

DETECTING WATER POLLUTION*

Jacqueline Cozart

Grade Range: 1-3

Approximate Time: One - 30 minute class period, or Two - 15 minute classes

Goal: This lesson is designed for students to develop an understanding of how humans and nature pollute water.

Objectives: Students will do the following:

1. Define pollution
2. Name a plant that can poison freshwater ponds
3. State ways that humans can cause water pollution
4. State reasons to explain why water pollution is a problem

Students will demonstrate mastery of above stated objectives with 80% accuracy.

Materials:

paper

pencil

magazines with pictures showing water pollution

*Detecting Water Pollution provides a basic understanding of the concept. The lesson plan following this -Making Polluted Water Clean-- allows for comparisons globally, nationally, and locally.

Multicultural Focus: "Multicultural education is less about knowing about other and MORE about knowing about self" (Locke, D., 1993). The multicultural focus of this lesson is for students to examine more about themselves and their community, with a particular focus on examining ways that we pollute our water. This

lesson also offers students choices for creating a project that best represent their knowledge of water pollution. The element of choice should appeal to the diverse learners in the class and also give students an opportunity to develop metacognitive skills. In this instance, students have to determine how they best express themselves (e.g., as speakers, singers, dancers, artists, or writers). Students will then use their preferred expressive mode to convey information they have learned.

Background Information and Focus:

Ask students - Have they heard the word "pollution"? What does pollution mean? Write students' responses on the board. Have children vote on responses that best match their definition. Let the child who offered the definition give an explanation of his/her response. After a few minutes, tell students that a simple definition of pollution means to make something dirty.

Ask students to generate examples of pollution. Teacher will write the list on the board (air, water, land, etc.). After looking at the list, ask students if their room can become polluted? At this point make the fine distinction that a bigger definition of pollution means to contaminate, to make unusable. The word generally refers to natural environmental things that are free to everyone. (Note: This activity allows students to examine the word in greater depth, by examining examples and nonexamples of the word.)

Give students an outline of the important information you want them to know. Younger students will need a card with pictures and

simple sentences. Upper grade elementary students could use an outline. Have students add to and complete the outline with examples you are discussing. (See below.)

People can pollute water by dumping trash into lakes. Factories also drain waste into rivers. Oil is another chemical pollutant. Some of the chemicals come from garbage dumps.

Now explain - although most water pollution is caused by human beings, some pollution is caused by nature. For example, certain types of plants called **blue-green algae** can poison fresh water ponds. (Show a picture of the blue-green algae.) These algae kill the fish in the pond and the animals that drink the water.

If we pollute water or allow it to become polluted faster than it is purified, the day may come when there will not be enough water for people, animals, or farming.

Collect completed outlines and give students credit.

Input:

Show students a sample of fresh water and a sample of polluted water. Have students identify differences between the two. Record observations on chart paper. Ask-**What happens when water becomes polluted?** (Students will respond, we can no longer use it to drink, cook or bathe.)

Closure

Read the poem:

Pollution Solution

The pollution solution has only two parts.
Just look and you'll see.
What has eight limbs and four eyes and two brains?
That's right? It's you and it's me!

(Styker & Bingham, 1990)

Have student volunteers review question on the outline. Have students generate a list of what they can do personally to prevent water pollution. (Hints: They can educate others through posters or personal conversations.) Review the list. Ask students to identify solutions that they currently practice and to identify those that they plan to practice in the future.

Evaluation:

Have students make a collage showing water pollution. Teacher will need to model with a premade collage.

Allow students to select one of the following projects to construct:

lower elementary students:

Using the theme "Ways to prevent water pollution and things that cause water pollution"

-Create a song

-Draw a picture

Upper elementary students:

-Write a story as if you were a forest animal. What would be your

opinion about water pollution? How would you feel about fresh water? How would you feel about polluted water? (Be sure to describe how it tastes, smells and feels and how it changes your life.)

-Create a dance

-Create a poem

-Write and sing a song. (Rap, country or any style the students selects will be accepted.)

-Create a poster to teach others about water pollution

Students will share their creations with their classmates. Not only will the teacher evaluate the projects for creativity, amount of information, and organization, but classmates will be required to write or draw a note and make one positive comment about the project.

Resources

Bellamy, D. (1988). **Our changing world: The river.** New York: Crown Publishers.

Locke, D. (1993). **Multicultural Education.** Presentation to Durham Community College.

National Wildlife Federation. (1991) **Lighthawk: Spotting polluters from planes.** Ranger Rick National Wildlife Federation.

Styker, S & Bingham, M. (1990). **Mother nature nursery rhymes.** Santa Barbara: Advocacy Press.

MAKING POLLUTED WATER CLEAN

Jacqueline Cozart

Grade Range: 1 -3

Approximate Time: 2 class periods (20 minutes each)

Goal: This lesson is designed for students to understand that waste water from toilets, tubs, dishwashers, rainwater draining into sewers, can be cleaned and reused. This process is called purification.

Objectives: Students will do the following:

1. Describe the water cleaning process
2. Demonstrate the water treatment process

Students will demonstrate mastery of above stated objectives with 80% accuracy.

Materials:

water	container
pebbles	wire screen
grass	egg beater
soil	coffee filter
red food coloring	chlorine bleach
eye dropper	

Multicultural Focus: "Only after people are exposed to other world views do they recognize their own and perhaps become more sensitive to those of others" (anonymous). The multicultural focus of this lesson is to provide students with opportunities to examine our country's water purification system and to examine this process from another country's perspective. Statistics and charts can be

age-appropriately simplified from World Almanac environmental sections to provide comparisons globally, nationally, locally.

Background Information and Focus:

Read poem: **What Would Mother Nature Do?**

What would Mother Nature think

Of trees burned down and air that stinks?

With dirty water in her sink,

What would Mother Nature think?

What would Mother Nature say

Of creatures who have gone away

The kinds once here that aren't today?

What would Mother Nature say?

What would Mother Nature do

To make the planet clean anew?

If she was standing here with you,

What would Mother Nature do? (Stryker & Bingham, 1990)

In a whole group discussion, have students brainstorm responses to some of the questions posed in the poem (e.g., What would Mother Nature think of dirty water in her sink? What would any mother think? Whom would she blame?)

Write student responses.

Did you know that water from your toilets, tubs, dishwasher and rainwater draining into storm sewers can be cleaned and reused? Be sure to inform students that our water purification system is highly regulated. We need an adequate supply of fresh water and we want the water we drink to taste good, smell good, and look good.

Above all it must be safe. Since fresh water is in such limited supply, we are lucky that water is recyclable. We will explore how treatment plants clean waste water and make it available for reuse. In this lesson you will learn how to clean your polluted water the way a city waste treatment plant does.

Input:

The teacher will explain and demonstrate the process students will use to clean water. After the explanation/demonstration, student pairs will repeat the experiment. The teacher will begin by demonstrating the process that city waste treatment plants use to clean water. First, make some dirty water. Fill a quart jar half full of tap water. Then drop in a few pebbles, a small handful of grass clippings, two tablespoons of soil, and a couple of drops of red food coloring. Stir to mix well. To clean your polluted water the way a city waste treatment plant does, you'll need a second container, a piece of wire screen, an egg beater, a coffee filter, chlorine bleach (laundry bleach), and an eye dropper. Now follow steps listed below to clean the water.

1. When the dirty water first enters the treatment plant, it is screened to remove only large particles. Place the wire screen over the second container and pour the water through the screen. Get rid of whatever was trapped and clean the empty jar.

2. Next, the water is pumped into a settling tank where dirt and gravel sink to the bottom. Let the water you poured into the second container sit for several hours or until the soil has settled, forming a layer on the bottom.

3. In some systems, the water is next mixed with air and pollution-eating bacteria. Pour the water into the clean jar, being careful not to mix in any of the settled debris. Clean out the container you just emptied, then pour the water back into it. Whip the water with the egg beater to mix it with air and let it sit for several hours.

4. In a real treatment plant the water is allowed another opportunity to settle and may be filtered again by being pumped through beds of sand and gravel. Place the coffee filter over the mouth of the clean jar and pour the water into the jar through the filter. Be careful not to dump out any waste that has settled to the bottom.

5. Finally chlorine gas is pumped through the water to kill disease-causing organisms. Add chlorine bleach one drop at a time to the water you're treating until any trace of the red coloring is gone and the water appears clear.

Of course the water you treated isn't really safe enough to drink, but now you know how water is recycled in water treatment plants. (Using a poster with the cycle clearly identified, teacher will review the process.) Student pairs using a chart showing both written directions and drawings will replicate the demonstration.

Closure/Evaluation:

The teacher will ask students to describe the cleaning (purification) process. Some students may want to role-play the different steps. Students will write in their science journals one step and explain why the step is important. Young learners can

draw a purification step.

Upper elementary students:

Have upper level students write to treatment plant supervisors in foreign countries to provide a simple explanation of how water treatment is conducted in their country. Once students receive responses, they can compare and contrast what we do and what is being done in other countries. Be sure to have students write to industrialized as well as nonindustrialized nations. An embassy may be a good source to try. Ask students to report their findings to the class. Discuss why other countries may have different purification systems. What might be some underlying causes?

Extension Activities:

- Arrange a visit to your community waste water treatment plant.
- Have children record in science journals the step-by-step process to purify water.
- Have upper level students research how Romans and other ancient civilizations (e.g., Egyptians, Chinese) conducted water treatment. Have students report their findings to the class.

Resources

Famighetti, R. (Ed.) (1994). **World almanac and book of facts.**

Mahwah, NJ: World Almanac Books.

National Geographic World. (1990). **The water we drink pure to polluted - A history of water.** National Geographic Society.

National Wildlife Federation, (1991). **Lighthawk: Spotting polluters from planes.** Ranger Rick.

Markle, S. (1991). **The kid's earth handbook.** New York: Athenum.

Stille, D.R..(1990). **Water Pollution.**

Stryker, S. & Bingham, M. (1990). **Mother nature nursery rhymes.**

Santa Barbara, CA: Advocacy Press.

Respecting Our Rain Forests

Margaret Marsh

Grade Range: 3-5

Approximate Time: Two (30-minute lessons)

Goal: This lesson is designed to teach students about tropical rain forests, the crucial role they play in creating our weather and atmosphere, and the necessity of preserving the world's rain forests.

Objectives: The student will do the following:

1. Define tropical rain forest
2. Locate tropical rain forests
3. Identify the layers of a tropical rain forest
4. Explain the relationship of the tropical rain forest to weather conditions and the earth's atmosphere
5. Identify indigenous plants and animals
6. Describe the lifestyles of indigenous people

Students will demonstrate mastery of above stated objectives with 80% accuracy.

Materials:

Books about the Rain Forests

Pictures of Rain Forests (National Geographic)

Word Cards (typed word [listed] on each card)

-Rain Forest

-Emergent

-Canopy

-Understory

-Forest Floor

Individual World Maps

12ft. art roll paper

Materials (continued):

assorted construction paper

markers

scissors

chart paper

worksheet: "Rain Forests of the World"

worksheet: "Treasures from the Rain Forests"

Multicultural Focus: "The simple realization that there are other points of view is the beginning of wisdom. Understanding what they are is a great step. The final test is understanding why they are held" (Charles M. Campbell). The two-fold multicultural focus of this lesson is to have students examine preservation of the rain forest from different perspectives. The instructional strategies require students to be actively engaged in the learning process.

Background Information and Focus:

Make class chart with three columns labeled, "What We Know," "What We Want to Know," and "How We Will Get Information We Need." Give students individual charts. Ask for a show of hands if students have heard the term rain forest? Have students complete their individual charts. (This is an important metacognitive strategy in that students access background knowledge prior to learning new information and they begin to think about what resources they will need to complete their task.) After students have completed their charts, have them brainstorm and complete the class chart collectively. Write students' responses on the chart.

In words appropriate to the particular group of students, teacher's message is: "Today we are going to learn about the rain forest: we will also learn about the crucial role that rain forests play in creating our weather and atmosphere. Finally, we will learn about the controversy surrounding the preservation of the rain forests." Teachers should point to the student-generated terms during lesson.

Continuing: "The term rain forest usually refers to the tropical areas found on land between the Tropics of Cancer and Capricorn. (Locate these areas on a world map during the discussion.) Very tall, dense jungles that have existed over millions of years are located along a broad belt near the equator. These jungles are found in the Amazon Region of Latin America, the Zaire Basin of Central Africa and the vast archipelago that reaches from Southeast Asia to Australia.

"Rain forests typically receive 15 to 30 feet of rain per year. The hot and humid atmosphere and the rich biological diversity provide the world with much tropical fruits, tropical timber, and exotic tropical animals and plants." Teacher should also describe the indigenous people of the area. If possible show pictures. Ask students, "Do you think that people in this area experience pollution? If yes, what kind?"

While mentioning the different indigenous groups, teacher should have students locate them on the world map.

Continuing: "The Yakuno Indians live in the northwest part of the Amazon Basin, the Kayapo use the farm land along the Xingu River

in central Brazil. Mayans live in the forests of Central America. Mbuti pygmies and members of the Baka and Efe Tribes live in Central Africa, the Lua people live in the rain forests of Thailand. The term 'pygmies' is not a term that these people use to define themselves. Rather it is a term given by the colonial powers. Therefore, "Mbuti" is the preferred term. The Penan make their homes in the forests of Borneo. Settlers have also moved into the forest seeking a better life than that of the urban slums. Continuing: "Rain forests grow in layers. The highest level, which includes the top of trees growing over 200 ft. tall, is the **emergent** level. Below that level grows 90 ft. trees. These trees grow very close together forming an umbrella type covering. This is the **canopy** level. The **understory** level includes young trees and the trunks of the trees in the **emergent** level. The lowest level, the **floor**, gets little sunlight and has sparse vegetation.

Additional Facts to Share

1. Rain forests contain nearly half of the trees that grow on earth and more than half of the total number of animal species.
2. Most plants and animals that grow in the rain forest grow nowhere else on earth.
3. About 1,000 tribes of indigenous people live in the rain forest.
4. Rain forests plants affect the balance of gasses in the atmosphere.
5. Rain forests are being cut down at between 90-100 acres per minute.

Scientists are beginning to understand the critical importance of rain forests to our world wide weather and atmosphere. The forests absorb carbon dioxide and release oxygen into the air, keeping the air supply clean. The forests also play a vital part in regulating the flow of water on earth.

Input: Randomly assign students to research teams. Each team will be responsible for reporting information about the following topics as they relate to the rain forest: indigenous people, different rain forest layers, plants and animals (to include information about endangered groups), and environmental issues.

Independent Practice: Have students report their findings. Younger students can construct a wall mural showing the different layers, indigenous plants, animals and people. Use word cards to label the different layers. Students will also make a world map highlighting the rain forest areas and including indigenous people. Display the map and mural in the hall or in the classroom. Also refer to 5 items under "Additional Facts to Share."

Closure: Using the completed mural, have students identify and describe the four layers of growth of tropical rain forests, describe the animals, plants and people.

Evaluation: Students will write letters to a pen pal in a country that has a rain forest. Among some of the questions that the students will ask are: Is the rain forest in your country being destroyed? Why? What is being done to prevent the destruction? Who is responsible for destroying the rain forest? Your students may receive some surprising responses.

Have students write letter to their grandparents or some other significant older person and describe what they have learned about the rain forests. They should also describe one way they plan to change their lives to conserve the rain forests (e.g., will not buy products made from endangered plants or animals). Include in these letters information they learned from their pen pals and allow students to state their opinions.

Extension:

1. Read several books related to the tropical rain forests.
2. Make a poster using the theme "Save the Rain Forests " for display. The poster must depict how we can help care for the rain forests by reducing, reusing, and recycling.
3. To get a pen pal from a tropical country with rain forest,

write: International Pen
 P.O. Box 65
 Brooklyn, N.Y. 11229

Connections to Other Subject Areas:

Library skills: In the process of completing the report, students will develop research skills.

Social Studies: Students will bring in some items that come from the rain forests. Display them in the classroom. Examples might include cashew nuts, mahogany wood, bananas, papaya, and coconuts.

Math: Make a graph showing several items that grow in the rain forests. Code the graph yes or no if you have seen or tasted the item.

Resources

- Baptista, L.H. (1992). **Discover Rain Forests**. New York:
Publications International, Ltd.
- Carson-Dellosa, A.T. (1993). **Endangered Rain Forest**. New York:
Carson-Dellosa Publishing Co.
- Famighetti, R. (Ed.) (1994). **World almanac and book of facts**.
Mahwah, NJ; World Almanac Books.
- Scholastic Inc. (1993). **Rain Forests: Integrated Theme Units**.

Garbage, Garbage Everywhere

Margaret Marsh

Grade Range: K-2

Approximate Time: Two (30-minute lessons)

Goal: This lesson is designed to teach students that regardless of who we are or where we live, we all share the common problem of garbage and its disposal.

Objectives: The student will do the following:

1. Define garbage
2. Identify ways that we can reuse and recycle garbage

Students will demonstrate mastery of above stated objectives with 90% accuracy.

Materials:

web chart

pictures of garbage for display

paper

disposable camera

poem: "The Rap on Garbage"

Multicultural Focus: The multicultural focus of this lesson is to explore the universality of common experiences, including problems such as garbage disposal.

Background Information and Focus:

(The following background information is available for inclusion into the lesson. Feel free to adjust for students' age level.)

Sample teacher-imparted information:

Did you know that an American family of four consumes over 2,000 pounds of paper, approximately 500 pounds of metal, 500 pounds of glass and 500 pounds of food scraps each year? We produce a lot of garbage. People in our country throw away more garbage than any other people in the world.

If all families throw away as we do, we have to wonder, "Where does all of our garbage go?" We all live in different houses or mobile homes or apartments or shelters. But what must each of us do with our garbage? Having too much garbage and no place to put it is a problem we must try to solve.

Being aware that garbage is everywhere is the first and most important step. In this lesson we will learn what happens to garbage when we throw it away; we will understand that garbage disposal is a common problem - - one that everyone in the world has to deal with - - and we will identify steps we can take to improve the situation.

First, let's look at some historical examples; for instance, during the 1750s, the streets and sidewalks were littered with animal refuse. Ben Franklin began the first attempt to dispose of garbage in pits.

Two-hundred years later, from 1940-1960, more disposable products were being used to cut down on household chores. There was an increased use of plastics, paper and toxic substances. These products ended up in dumps and landfills. (As you describe dumps and landfills show pictures.)

In the 1970s, incinerators were used, but these were expensive and produced air pollution. This process also left toxic ash to deal with. Today, in our country, people are becoming more aware of the garbage dilemma and have begun to recycle.

Input:

Have the word "garbage" written on board. Ask students if they have seen the word and if they can read it. Have students read the word aloud. Ask students, "What is garbage?" Give some examples. Have students work in small groups to brainstorm for a definition. (This procedure insures that more students have an opportunity to talk.)

Have small groups complete a word web. As they complete their webs, they should answer the following questions:

- What is garbage?
- Why is garbage disposal a problem?
- How can we cut down on garbage?

After a sufficient amount of time, allow students to share the webs they have created. Have students show their webs and explain their responses. Write definitions and examples on board. Tell students that garbage is what we throw away because we no longer need or want it. Most people ball up, tear up, fold up and toss out garbage without a second thought. Garbage can come in any size or shape. It could be as tiny as a little piece of paper or as large as an old junk car.

Guided Practice:

Read poem

"Rap on Garbage"

Too much garbage,
Not enough space.
Got to be careful
Not to replace
Tulips with tin cans,
Meadows with glass,
Forests with dump grounds,
Fresh air with gas.
Reuse or recycle,
Don't throw things away.
Let's make a new start here,
Begin a new day.
From the depths of the ocean
To the top of the Alps,
Every litter bit hurts,
Every little bit helps.

(Maeno and mother nature)

According to the poem, what happens when we have too much garbage? What does the author of this poem tell us to do? (reuse and recycle). Record students' responses. Discuss rhyming words and ask students to write short poems that express how they feel about trash. Encourage them to think of how their families feel and respond to trash. Keep the student-generated words on display for students' use as they compose their poems.

Ask, "How do you think trash is disposed of in other parts of the world? Could garbage disposal become a worldwide problem?" Teacher will provide some input regarding this issue.

Read "Just a Dream" by Chris Van Allsburg. This story is about a boy too busy to think about the consequences of littering and the importance of recycling. He is always thinking about high tech. When he falls asleep, he has a nightmare about the planet's future, because of our inability to properly dispose of trash. In a nonthreatening and entertaining manner, this contemporary book asks students to think about the issues of littering and recycling.

Have students use disposable cameras to take pictures of ways that we dispose of garbage in our own neighborhoods. Create a pictorial essay. Younger students can dictate sentences to accompany their pictures. Older students can write captions under the pictures. Examples of pictures might include a dumpster, recycling bins, a house with recycling containers in the front or a dumpster for vegetable waste only. Children must include at least one picture of themselves recycling or reusing material. Caution parents not to leave children to their own devices when taking pictures.

Closure:

Allow students to share their poems. Later have someone type and edit poems for display. Also during art, ask students to illustrate their poems.

Display students' photo essays.

Evaluation:

Have students respond to following review questions:

- What is garbage?
- What size does garbage come in?
- Do all people have the same kind of garbage?
- How do you feel about garbage?
- Why is garbage a common problem?

Evaluate student poems.

Connection to Other Areas:

Language Arts - Make a class "garbage poems" book. This will be a collection of students' poems.

Science - "Garbage and Germs" - Discuss with students the relationship between garbage and germs which cause illnesses.

Resources

Allsburg, C. (1990). **Just a Dream**. New York: Houghton Mifflin Co.

Stryker, S. & Bingham, M. (1990). **Mother nature nursery rhymes**.

Santa Barbara, CA: Advocacy Press.

Ready - Set - Recycle

Margaret Marsh

Grade Range: 3-5

Approximate Time: Three (30-minute lessons)

Goal: This lesson is designed to teach students the importance of recycling and to encourage students to recycle.

Objectives: The student will do the following:

1. Identify the 3 Rs of recycling (reduce, reuse, recycle)
2. Sort garbage
3. Recall the importance of recycling

Students will demonstrate mastery of above stated objectives with 90% accuracy.

Materials:

picture cards
6 large boxes
6 plastic bags
magic markers
recording paper
copies of newspapers and magazines for the past six months
scissors

Multicultural Focus: "Democracy cannot be achieved without understanding power itself, how it is exerted, and where it lies" (Anthony Arblaster, *Democracy*). The multicultural focus of this lesson is to provide an opportunity for students to examine social structure inequality as it relates to environmental issues. In so doing students will analyze power and status issues in our society.

Focus: Read poem: Plastic and Glass

Plastic and glass

Plastic and glass

Recycle these items

Don't put in the trash. (Stryker & Bingham, 1990)

Teacher: Do you recycle at home? If yes, what do you recycle? A few years ago, garbage disposal became a controversial issue. An overloaded barge filled with garbage left New York to dump the garbage in a landfill in another state. No other state wanted it. The barge, filled with stinking garbage, went from port to port all over the world. When there was no place to dump, the barge returned to New York. This voyage became a news story in the papers, on the radio, and on the TV. People began to realize that we are running out of places to dump our trash.

The Garbage Project begun by William Rathji, an archeologist at the University of Arizona, increased people's awareness of the issues. He dug up landfills and made some startling discoveries. He uncovered perfectly preserved food and readable newspapers, some over 20 years old. Why? The garbage never decomposed! He also found out that 40% of what's in a landfill is paper.

So much garbage, What should we do about disposing it? Environmentalists advise us to recycle and to use the following categories of recycling.

reduce

reuse

recycle

Reducing means buying products only if they are packaged in recyclable or biodegradable containers.

Reusing includes everything from reusing plastic bags to giving away old clothes.

Recycling is being alert to what is thrown away, having appropriate bins and getting recyclables to the proper recycling places.

Bins are available for recycling the following materials:

metals

glass

paper

old clothes

plastics

Input: Show students different pictures of landfills. Ask What do you think this is? Is this landfill necessary? Why or why not? What would happen to our environment if we did not have any landfills? (Wait for responses.) What seems to be the problem with landfills?

Some have suggested that landfills are disproportionately placed in or near poor communities. They also suggest that poor communities have had to shoulder a heavier burden to maintain a healthy environment.

In your opinion are poor communities expected to shoulder a heavier burden than more affluent communities? Let's examine your own community. Locate landfills in your community. Describe the neighborhoods nearby. Would you classify these neighborhoods as

poor or affluent? Explain your response. Based on your research respond to the statement - "Landfills are disproportionately placed in or near poor communities." If your data show that landfills are more frequently located near poor neighborhoods, discuss reasons given to account for this. Also ask, Is it o.k.? Is it because people with less money in our society have less power? Is it fair? If not, what can we do about it? (Suggest writing letters to the editor to report their findings and to express their opinions.)

Have students identify the location of recycling bins. Are recycling bins more often located in middle class neighborhoods? Look at housing projects: Are recycling bins located there? Discuss why recycling bins are located in some places and not in others. Do your responses indicate that the poor are shouldering a disproportionate burden to maintain a healthy environment?

A recent example concerns Chatham County. A poor community, heavily populated by African-Americans, was selected as a landfill site to dump nuclear waste. It caused some controversy, but not nearly as much as it did when a suburban Wake County site was selected. Allow students to analyze the different ways views were presented in the newspapers. If your students are able to identify such differences as issues, have students share the issues and discuss them.

As a method to generate a discussion about these issues, have students participate in an experiential activity called, **Taking A Stand**. You will need two cardboard posters or signs, one with the

words "Strongly Agree" and one with the words, "Strongly Disagree" printed in large, clearly visible letters. These should be placed on opposite sides of a room or on two trees (if outside) approximately 20-25 feet apart.

Introduce the activity by telling the group: "We're going to do an activity called Taking a Stand. I will read a statement, and you line up anywhere on the continuum between these two signs (point to the signs) where you feel you belong." Start with an easy, non-controversial issue as an example.

"Chocolate ice cream is the best ice cream in the world!"

Use statements that are worded to get an agree or disagree response. After reading the statement, have students move to their positions, then ask selected students representing different points of view to express their opinions (O'Malley & Davis, 1993). For example, you can state "It is o.k. to locate a disproportionate number of landfills in poor neighborhoods because poor people don't take care of things anyway."

You will have to discuss this issue in a sensitive manner. Try to guide student opinion expressions to the conclusion that poor people, like all other people, want to take care of their property. Often they do not have the means to do so.

If a controversial environmental issue is being debated in your community, invite people who represent both sides of the argument to your class to discuss the issue so students can hear both view points. Prepare students to respond to differing points of view with courteous behavior.

Recycle. Having established the fact that garbage disposal is a big issue, present recycling as an alternative solution. Explain the three categories of recycling.

reduce

reuse

recycle

Invite a speaker to talk about the recycling process, prepared to answer: How can we reduce throw away garbage? Why do some people reduce and reuse while others do not? Who benefits from reducing, reusing and recycling? In what ways? How could the three Rs benefit the entire planet? Explain why recycling is a wise choice.

Teacher can suggest beginning recycling in our own bins in the classroom. Write the sorting categories on the board.

paper

glass

metal

food

plastics

old clothes

Divide class into six groups. Each group is to work together and design a bin for recycling. Assign each group a category. Clearly label boxes and put plastic bags in each box. Have students draw on each box. The drawings should relate to the contents in the box.

Independent Activity: Students who are able to do research and writing without teacher overseeing should be encouraged to use library facilities to explore the 3 Rs as needed and or practiced in other countries -- developed, developing, underdeveloped.

Teacher: Is recycling necessary in the United States? Why or why not?

People all over the world are recycling. Even in China, bottles are carefully sorted and put into wire baskets. Cardboard is neatly folded and stacked. This makes it easier to haul by bicycle, their main means of transportation. Choose this or another country to examine the three Rs and write a report on how they are handling their problem. For example, What can a fourth grade student in Japan, Egypt, Israel, Jamaica, or Nigeria do?

Closure: Ask students to sort and deposit their trash in the appropriate bin for five days. At the end of the fifth day, the students will weigh each bin to determine in which bin more garbage was collected. Prior to telling students the weight of each bin, ask students to predict which bin weighs the most and to explain their answer.

Evaluation: Students will identify and explain the 3 Rs of recycling through verbal questioning. Write students' responses on the board.

-What does reduce mean? How will you personally reduce the amount of garbage you generate.

-What does reuse mean? Give one example of how you will reuse something.

- What does recycle mean? Give one example of how you will recycle.
- Why do we need to recycle?
- What can you do to recycle?
- In your opinion, do disadvantaged populations in the United States share an undue burden with garbage disposal? Explain your response.
- Is recycling only necessary in the United States? Why or why not?

Extension:

Communications (Writing). Have students make a recycling/sorting book. Find pictures in magazines of things to sort.

Science. Make a compost pile.

-Take a fieldtrip to a local bottling company.

-Take a fieldtrip to a local recycling plant.

-If students identify that disadvantaged U.S. populations are shouldering a larger burden for our garbage disposal, ask students to write a letter to the editor expressing their views on the issue. If possible, offer suggestions as to how the authorities can change the situation.

Connection to Other Subjects:

Math. Make a graph showing the weights of the recycling boxes.

Art. Draw pictures of a landfill. Use resource materials in the library.

Science. Make a list of what bins you think will decompose first, second, and third. Explain your response.

Resources

Bailey, D. (1991). **What we can do about recycling.** New York:
Franklin Watts Publisher.

Greene, C. (1991). **The old ladies who liked cats.** Chicago: Harper,
Collins.

O'Malley, M. & Davis, T. (1993). **Multicultural Education &
Intergroup Relations Training Manual.** Unpublished manuscript.

Recycling Makes Sense and Cents

Jacqueline Cozart

Grade Range: 1-3

Approximate Time: Two (30-minute lessons)

Goal: This lesson is designed for students to gain a healthy appreciation for our environment and become knowledgeable about conservation through recycling.

Objectives: The student will do the following:

1. Define recycling
2. Identify reasons to support recycling
3. Identify two ways money can be made by recycling

Students will demonstrate mastery of above stated objectives with 90% accuracy.

Materials:

pictures

slides

Multicultural Focus: "Situations in which people from different groups work together toward common goals seem to diminish fears and increase understanding" (Wein, 1992). The multicultural focus of this lesson is to provide opportunities for students to work in small mixed groups toward achieving a common goal. Additionally, the activity will facilitate the development of and appreciation for each student's creative and critical thinking skills.

Background Information and Focus: Recycling involves the collections of used goods, treating the materials so they can be reused. An average American family consisting of four people

consumes over 2,000 pounds of paper, approximately 500 pounds of metal, 500 pounds of glass and 500 pounds of scraps per year. An average person in the United States produces a ton of solid waste each year. In order to safeguard our environment, we must all recycle as much as possible. Recycling not only saves space in landfills, but it saves energy, too. The energy saved by recycling just one glass bottle will light a 100-watt light bulb for 4 hours. Aluminum and glass can be sold to make money.

Input: The teacher will show slides and photographs of paper, glass, food scraps, and other items that can be recycled. The slides will also show items that are made out of recycled materials. Have students analyze trash in their classroom trash bin.

Ask students the following questions:

1. What do we mean when we say recycle?
2. How can you reduce the paper that your family uses?
3. How can you reduce the amount of metal that your family uses?
4. How can you reduce the amount of glass your family uses yearly?
5. How can you reduce the amount of food thrown away?
6. Why is recycling important?

-Make a chart and list students' suggestions under each category.

-Tell students that two ways to make money by recycling are to sell metal containers and glass.

-Divide the class into small groups. Ask them to think of four creative uses they have for recycled goods. They will be responsible for creating one of their suggestions. Students must

turn in a detailed sketch (words and/or drawings) of their plans for the creative project. They must show or tell: What useful purpose does the project have? How much time will it take to assemble? What recyclable goods will you use?

Independent Practice and Guided Practice:

Student groups will assemble projects.

Evaluation:

Each group will present its project to the class. Class members will write a note and make one positive comment about the project. They may also ask questions.

Closure:

Read the story "Trash" by Charlotte Wilcox.

Connection to other subject areas:

Art: Create a Trash Tree

Social Studies: Plan an Earth Friendly Picnic

Resources

Johnson, J; Mitchell, C.T.; & Kean, E. SPARCS ignites multicultural science education. *Educational Leadership*, 51 (8), 36-40.

Stokes, J. (1977). *Let's be nature's friend*. New York: Henry Z. Walck. Inc.

Wilcox, C. (1988). *Trash*. Minneapolis: Carolrhda Books Inc.

Where's The Fresh Air?

Jacqueline Cozart

Grade Range: 4-5

Approximate Time: Three (30-minute lessons)

Goal: This lesson is designed for students to understand that air pollution is inside and outside.

Objectives: The student will do the following:

1. Define the "sick" building syndrome
2. Identify places where air pollution can exist
3. Identify some of the "sick" building trouble makers
4. Identify some of the health problems that pollutants can cause

Students will demonstrate mastery of above stated objectives with 90% accuracy.

Materials:

paper

encyclopedia

dictionary

Multicultural Focus: "It is always better to form the habit of learning how to see things for yourself, listen to things for yourself, and think for yourself; then you are in a better position to judge for yourself" (Malcolm X). The multicultural focus of this lesson is to provide students with opportunities to research a topic independently and to teach as well as to learn from fellow classmates of all backgrounds.

Background Information and Focus: During a smog alert it is a good idea to stay outdoors, right? That depends on whether the air inside is better or worse than the air outside. Experts are discovering that serious air pollution can exist inside houses, offices and schools, and other buildings - a phenomenon that's been labeled "sick building syndrome." The pollutants come from a variety of sources. Teachers should ask students to name common house or office supplies that may pollute the air. Write students responses. Read the student-generated list: (Circle students' responses that are similar. If students mention something that is not on the list, discuss it and determine if it belongs on the list or not.) The List should include the following: treated wood and other construction material, carpets, copy machine, art supplies, cleaning fluids, heating and cooling systems, to name a few. Materials included are those that tend to build up in energy-efficient, relatively airtight buildings.

Pollutants such as nitrogen oxides, carbon monoxide, and chloroform are some of the common sick building troublemakers. As they build up and interact with each other, these and other pollutants are thought to cause health problems ranging from minor irritations like sore throats to serious diseases like cancer. Cutting down on the sources of these pollutants and improving ventilation are the best ways to control indoor air pollution. We can also get help from pollution fighting plants. Philodendrons, spider plants, and gerbera daisies are a few of the best pollution fighters. They are able to absorb the carbon dioxide in the air.

Input: In addition to general library work on the sick building syndrome, students will identify businesses and other organizations that may provide information about the topic. Write a letter to the business requesting information. The teacher will edit letters, send letters to the businesses, and wait for a reply. During the first 10 minutes of class, have students share their responses with the class. If possible, invite someone from the Environmental Protection Agency to talk about the topic, especially how to use plants and other natural ways to fight pollution.

Closure: Review information learned. Have students create a fact sheet showing the five most interesting facts they learned from working on this project.

Read poem: **Where is the fresh air?**

Is it anywhere?

Inside or out,

Air pollution is all about.

One thing about air pollution,

Fighting it is the solution. (Cozart, 1994)

Evaluation:

 The teacher will evaluate students' fact sheets for accuracy, level of interest and creativity in presenting ideas.

Resources

Braus.J. (1990). Nature scope pollution: Problems and solutions.

Fisher, A. (1993). Super Science.

National Geographic Society. (1990). The inside story of clean
air. National Geographic World.

National Wildlife Federation. (1991). Lighthawk: Spotting
polluters from planes. Ranger Rick.

Wheeler, J. (1990). The air we breathe.

How Clean Is Our Air?

Jacqueline Cozart

Grade Range: 1-5

Approximate Time: Two (30-minute lessons)

Goal: This lesson is designed for students to understand how air gets polluted.

Objectives: The student will do the following:

1. Describe how people pollute the air
2. Describe how factories pollute the air
3. Describe how automobiles pollute the air

Students will demonstrate mastery of above stated objectives with 90% accuracy.

Materials:

paper
candles
glass bottle
pen pal lists

Multicultural Focus: "Multicultural education is the process of examining our own culture and 'unlearning' its biases" (anonymous). The multicultural focus of this lesson is to provide students with opportunities to examine cultural norms and take action to make changes to enhance clean air we share.

Background Information and Focus: Air pollution occurs all over the world. It first became a problem over 100 years ago. Many activities of human beings pollute the air. Ask, How do you think people pollute the air? Write students' responses. Use the

following list to check students' responses. The following items can pollute the air: chemicals, poisonous gases and tiny particles of dirt; factories and power plants that burn coal and give off smoke; automobiles exhaust fumes (created when gasoline is burned in the car's engine). Polluted air is harmful to people. It can even cause sicknesses.

Teacher: Today we are going to learn how all people, factories and automobiles pollute the air.

Input: The teacher will discuss the importance of clean air and why we need clean air to breathe and live. Demonstrate the following experiment to show how smoke makes the air dirty.

First, light one candle and hold it under the glass bottle. Have the students observe what happens. Then light a second candle and hold the glass bottle over the two candles. What happens? (The glass becomes dirty.) Tell students that this is what happens to the lungs when people smoke. Encourage children to predict what would happen if there were four lighted candles. Have a child rub his/her finger over the blackened glass. Ask students to describe how the darkened areas feel. Encourage children to explain what made the glass black. If they do not know, explain what smoke is. Ask children what they think happens when smoke goes into the air. Discuss various sources of smoke.

Independent Practice: Take students to a road area. Ask them to count the number of cars that drive by. They will count the number that have one person and the number of cars that have two or more people. The students will report on the number of cars counted.

Students will discuss the importance of automobiles in their personal lives. They will discuss why we all should try to cut down on car usage. Next, students will generate a list to show how they will assist their families in cutting down on automobile usage. Students should compare what they think the differences are in countries with fewer cars.

Another activity to demonstrate the potential impact of exhaust from cars is to place a tube sock over an exhaust pipe. Idle the car for five minutes. Turn the sock inside out and look at collected particles. Graph age of cars test and type of fuel burned with the amount of particles collected.

Evaluation:

Students will write letters to their families. The letters will recommend ways that the family can reduce its dependence on the automobile. Students will write pen pals in foreign countries to ask how often the children use automobiles and to describe other modes of transportation they use.

Resources

International Pen. P.O. B 65, Brooklyn, NY 11229.

National Geographic Society. (1990). The inside story of clean air.

National Geographic World.

Roettger, D. (1991). Pollution, recycling, trash, and litter.

Stille, D. R. (1990). Air pollution. Chicago: Children's Press.

Environmental Proverbs

Fran Jackson

Grade Range: 5 and up

Approximate Time: Two (30-minute lessons)

Goal: This lesson is designed for students to explore cultural assumptions and values regarding the environment by examining proverbs.

Objectives: The student will do the following:

1. Define the word proverb
2. Locate proverbs from different cultures that reflect values related to the environment
3. Interpret proverbs and identify the cultural values they reflect

Students will demonstrate mastery of above stated objectives with 80% accuracy.

Materials:

resource books with lots of proverbs from different cultural groups

(Make sure to include proverbs from America's diverse cultural groups.)

Multicultural Focus: One way to gain a greater appreciation for different cultural groups is to gain a better understanding of their language and language use. Bennett (1990) reminds us of this point when she states, "Language is at the heart of culture and cognition." Proverbs are defined as short statements that set forth a general well-known truth. Proverbs convey information

about a cultural group's values, customs and opinions. The multicultural focus of this lesson is to provide students with an opportunity to learn about different cultural values regarding the environment through an examination of proverbs from diverse cultural groups.

Background Information and Focus: Teacher: Raise your hand if you have heard the saying "Cleanliness is next to godliness." Where have you heard it? What does it mean? What group of people created that saying? Most students will respond that they have heard the saying. It extols the virtues of cleanliness and it is an American saying. What about "Birds of a feather flock together?" Again students will respond that they have heard it. It conveys the idea of guilt by association. It also is an American saying. Have you heard this proverb, "To every bird its own nest is charming." Most students will respond, No. This proverb comes from another country, Japan. What do you think it means? Can you think of an American saying that is equivalent to it. Some may suggest, "Every frog praises his/her own pond." (Or some may use more feisty language. Be good natured. Be prepared.) Give students other examples of proverbs from other countries. For example, "The horse who arrives early gets good drinking water" (South Africa).

Input: Give students a sufficient amount of time to identify proverbs. Remind them that they are to select proverbs representing at least two different cultural groups. Once they have selected a proverb, students must write a brief paragraph stating what the

proverb means. What value does the proverb convey regarding the environment? Identify a parallel proverb from your own ethnic culture.

Evaluation: Students will share their proverb in the following manner. First, they will state the proverb. Next, their fellow classmates will try to guess where the proverb may have come from. Students will also attempt to interpret what cultural values the proverb conveys, especially with regard to the environment. Finally, the students giving the presentation will share their research about the proverb.

The evaluation will be based on how well the student is able to interpret the proverb. Finally, ask students to create their own proverb about the environment.

Resources

- Allen, J; McNeill, E.; Schmidt, V. ((1992). **Cultural awareness for children.** CA: Addison-Wesley.
- Bennett, C.I. (1990). **Comprehensive multicultural education.** (2nd ed.). MA: Allyn and Bacon.
- Pusch, M.D. (1979). (ed.). **Multicultural education: A cross cultural training approach.** ME: Intercultural Press.